Questionnaire about LLM-Aided Customized Smart Home Applications

Name: _____ Occupation: _____

Hello! Thank you for participating in our survey. Our goal in this survey is to find out how people would interact with an AI smart home controller, and specifically how they would express their needs on smart home automation to an LLM (Large Language Model) such as ChatGPT[1].

In the questionnaire, you will describe four smart home automation ideas based on the following information:

1. The layout of your smart home scenario.
2. Sensors and smart devices functionalities.

Data Processing Statement

All collected information in this survey will be used solely for research purposes. Your personal information will not be disclosed or shared. The final research results will be released as open source, including the paper and prototype, but no personal information will be contained.

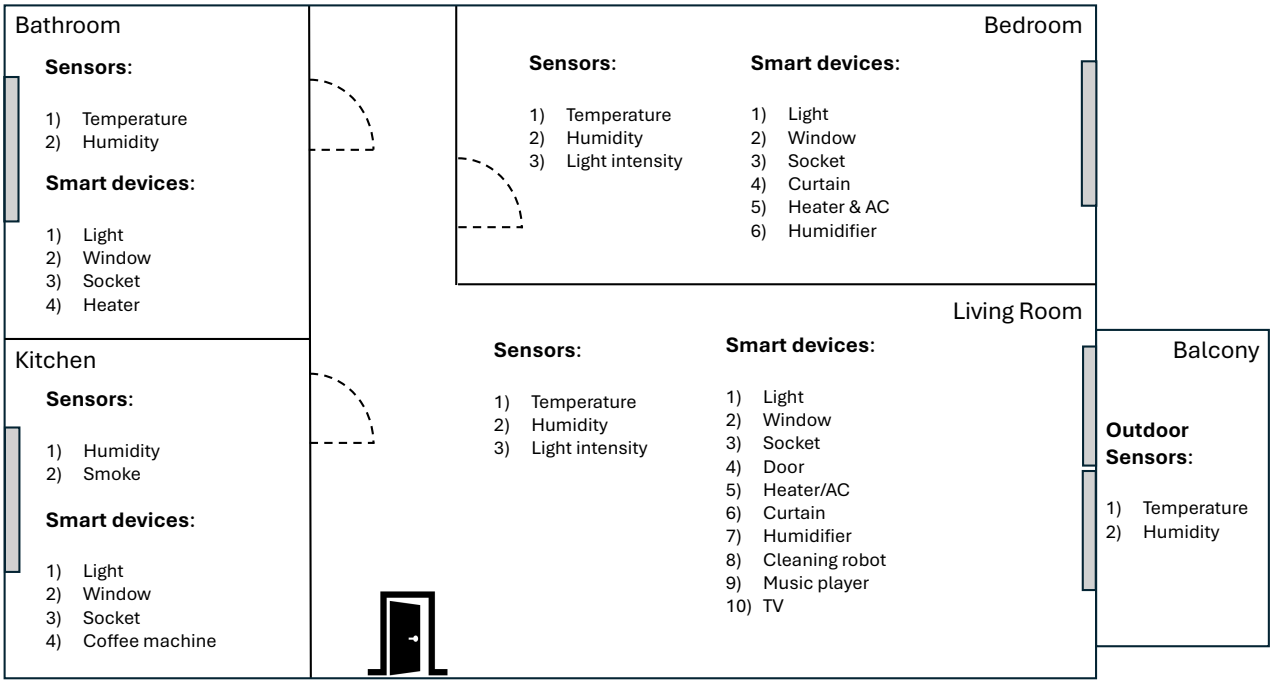
[1] A large language model is an advanced artificial intelligence system designed to understand and generate human language. It has been trained on vast amounts of text data, allowing it to perform tasks such as answering questions, writing coherent text, and engaging in conversations. By leveraging deep learning techniques, it can understand context, meaning, and nuances in language, making it a powerful tool for various applications like customer service, content creation, and language translation. We use the term ChatGPT as it is the most well-known AI large language model.

Scenario

In **Figure 1**, we present a smart home scenario, highlighting the arrangement and integration of sensors and smart devices across various rooms: the living room, kitchen, bedroom, and bathroom.

This scenario serves as the foundation for discussing four smart home automation ideas. We aim to illustrate how sensors and smart devices can enhance daily living.

Figure 1: Smart Home Scenario



Smart Device Functionalities and Sensor Readings

We list the functionalities of the smart devices in **Table 1** and provide information on the sensor readings in

Table *2*.

Table 1: Smart Device Functions

Smart Devices	Specific Functions	Common Functions
Light	Set brightness level (to low, medium or high)	Turn on / Turn off
Cleaning Robot	Run a cleaning routine	
Music Player	Play a specific playlist, like morning vibes, daily news, etc.	
Coffee Machine	Make a specific kind of coffee like Americano, Cappuccino, etc.	
Heater	Set a temperature value, for example, 25 degrees Celsius	
Air Conditioner (AC)	Set a temperature value, for example, 25 degrees Celsius	
Humidifier		
Curtain		
TV		
Socket		
Door		Open / Close
Window		

Table 2: Sensor Reading Type

Sensor Type	Reading Type
Temperature	Degrees Celsius (°C)
Humidity	Relative Humidity (%)
Light Intensity	Strong, Normal or Weak
Smoke	Safe or Warning

Idea 1: Remote Device Control

You may want to turn on the air conditioner in advance before you arrive home, or before you go to bed, you want to turn off the lights in your room via your phone.

How would you describe to ChatGPT this feature that allows you to control any smart device in your home remotely?

Tell us what you want to say to ChatGPT here:

Idea 2: Scheduled Plans

You might have fixed routines every day, for example, mornings or evenings, or when back home or leaving home.

If you want your smart home app to trigger your predefined plans through keywords or time, how would you describe this feature to ChatGPT?

Assuming you have the following three plans, tell us how you will describe your requirements and plans to ChatGPT.
(Please use all listed sensors and smart devices for each plan.)

Morning Plan:

sensors: *light intensity sensor*

smart devices: *coffee machine, curtain, light, music player*

Leave Home Plan:

smart devices: *door, curtain, light, sockets*

Movie Plan:

smart devices: *curtain, light (specify brightness level), TV*

Idea 3: Comfort Home:

You may want your living environment to be automatically adjusted to keep a comfortable level. For example, an air conditioner will automatically turn on when the room temperature is high.

How would you describe this idea to ChatGPT? Write your answer from the temperature, humidity, and light intensity perspectives:

Temperature:

Humidity:

Light intensity:

Idea 4: Energy Efficient Home

Energy can be saved even by small steps, and this process can be automated.

For example, opening windows can sometimes help achieve a comfortable temperature and humidity without using air conditioning or a heater. Or, when using a heater, air conditioner, or humidifier, it's important to ensure that the windows are closed.

Combined with the sensors and smart devices shown in **Figure 1**, how would you instruct ChatGPT to take the energy concern into your smart home application?

Tell us your answer here: